

What is claimed is:

1. A light-emitting semiconductor device comprising:  
a first reflection film to reflect light with a wavelength

5  $\lambda$ ;

a light emitting layer formed on said first reflection film,  
said light-emitting layer being injected with electric current to  
emit light with a wavelength of about  $\lambda$ ;

a second reflection film formed on said light-emitting  
10 layer to reflect the light with the wavelength  $\lambda$ , said second  
reflection film being provided with a periodical structure  
alternately stacked with a first semiconductor layer and a second  
semiconductor layer, wherein a reflectivity with respect to the light  
with the wavelength  $\lambda$  of said second reflection film is lower than  
15 that of said first reflection film;

an electric current spreading layer formed on said  
second reflection film to transmit the light with the wavelength  $\lambda$ ,  
said electric current spreading layer being the same electronic  
conduction type as said second reflection film and having not less  
20 than half of a thickness of said second reflection film;

a contact layer formed on said electric current spreading  
layer, said contact layer being the same electronic conduction type  
as said second reflection film; and

a high resistance region formed in a part of said second  
25 reflection film.

2. A light-emitting semiconductor device according to Claim 1, wherein said light-emitting semiconductor device is capable of operating at a speed of not less than 500 Mbps.

5           3. A light-emitting semiconductor device according to Claim 1, wherein said first semiconductor is made of a III-V group compound semiconductor and said second semiconductor is made of a III-V group compound semiconductor in which a V group element is common with that of said first semiconductor.

10           4. A light-emitting semiconductor device according to Claim 2, wherein said first semiconductor is made of a III-V group compound semiconductor and said second semiconductor is made of a III-V group compound semiconductor in which a V group element  
15 is common with that of said first semiconductor.

          5. A light-emitting semiconductor device according to Claim 1, wherein said first semiconductor is made of  $\text{Al}_j\text{Ga}_{1-j}\text{As}$ , ( $0 \leq j$ ), and said second semiconductor is made of  $\text{Al}_k\text{Ga}_{1-k}\text{As}$ , ( $j < k \leq$   
20 1), and said electric current spreading layer is made of  $\text{Al}_z\text{Ga}_{1-z}\text{As}$ , ( $0 \leq z \leq 1$ ).

          6. A light-emitting semiconductor device according to Claim 2, wherein said first semiconductor is made of  $\text{Al}_j\text{Ga}_{1-j}\text{As}$ , ( $0 \leq j$ ), and said second semiconductor is made of  $\text{Al}_k\text{Ga}_{1-k}\text{As}$ , ( $j < k \leq$   
25 1), and said electric current spreading layer is made of  $\text{Al}_z\text{Ga}_{1-z}\text{As}$ ,

( $0 \leq z \leq 1$ ).

7. A light-emitting semiconductor device according to Claim 3, wherein said first semiconductor is made of  $\text{Al}_j\text{Ga}_{1-j}\text{As}$ , ( $0 \leq j$ ), and said second semiconductor is made of  $\text{Al}_k\text{Ga}_{1-k}\text{As}$ , ( $j < k \leq 1$ ), and said electric current spreading layer is made of  $\text{Al}_z\text{Ga}_{1-z}\text{As}$ , ( $0 \leq z \leq 1$ ).

8. A light-emitting semiconductor device according to Claim 4, wherein said first semiconductor is made of  $\text{Al}_j\text{Ga}_{1-j}\text{As}$ , ( $0 \leq j$ ), and said second semiconductor is made of  $\text{Al}_k\text{Ga}_{1-k}\text{As}$ , ( $j < k \leq 1$ ), and said electric current spreading layer is made of  $\text{Al}_z\text{Ga}_{1-z}\text{As}$ , ( $0 \leq z \leq 1$ ).

9. A light-emitting semiconductor device according to Claim 1, wherein said second reflection film is made of a III-V group compound semiconductor in which an average Al composition is not less than 0.4 and said electric current spreading layer is made of a III-V group compound semiconductor in which an Al composition is not less than 0.2.

10. A light-emitting semiconductor device according to Claim 2, wherein said second reflection film is made of a III-V group compound semiconductor in which an average Al composition is not less than 0.4 and said electric current spreading layer is made of a III-V group compound semiconductor in which an Al

composition is not less than 0.2.

11. A light-emitting semiconductor device according to Claim 9, wherein said first semiconductor is made of  $\text{Al}_j\text{Ga}_{1-j}\text{As}$ , ( $0 \leq j$ ), and said second semiconductor is made of  $\text{Al}_k\text{Ga}_{1-k}\text{As}$ , ( $j < k \leq 1$ ), and said electric current spreading layer is made of  $\text{Ind}(\text{Ga}_{1-c}\text{Al}_c)_{1-d}\text{P}$ , ( $0 < c \leq 1$ ,  $0 \leq d < 1$ ).

12. A light-emitting semiconductor device according to Claim 10, wherein said first semiconductor is made of  $\text{Al}_j\text{Ga}_{1-j}\text{As}$ , ( $0 \leq j$ ), and said second semiconductor is made of  $\text{Al}_k\text{Ga}_{1-k}\text{As}$ , ( $j < k \leq 1$ ), and said electric current spreading layer is made of  $\text{Ind}(\text{Ga}_{1-c}\text{Al}_c)_{1-d}\text{P}$ , ( $0 < c \leq 1$ ,  $0 \leq d < 1$ ).

13. A light-emitting semiconductor device according to Claim 1, wherein the number of stacked pairs of said first and second semiconductors ranges from 4 to 12.

14. A light-emitting semiconductor device according to Claim 3, wherein the number of stacked pairs of said first and second semiconductors ranges from 4 to 12.

15. A light-emitting semiconductor device according to Claim 5, wherein the number of stacked pairs of said first and second semiconductors ranges from 4 to 12.

16. A light-emitting semiconductor device according to Claim 7, wherein the number of stacked pairs of said first and second semiconductors ranges from 4 to 12.

5           17. A light-emitting semiconductor device according to Claim 9, wherein the number of stacked pairs of said first and second semiconductors ranges from 4 to 12.

10           18. A light-emitting semiconductor device according to Claim 11, wherein the number of stacked pairs of said first and second semiconductors ranges from 4 to 12.

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